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Timothy Do

John Novakowski

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Sustainable Pharmacy: A Regimen for the Future

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Abstract

This article serves to introduce some of the issues that the pharmacy industry faces regarding sustainable practices and how to address them. The industry of pharmacy creates waste and pollution via improper drug disposal, medication waste, and operational waste. Thus, it is important for the industry to look towards reducing waste and pollution in order to increase sustainability, benefitting both patients and the world at large.^{1,2} Pharmacy is moving towards a more sustainable future, but balancing the needs of patients, legal requirements, economic considerations, and the safety and efficacy of medication poses a difficult task. To address many of these needs, policy changes at state and federal levels will need to be implemented, but these can take years. Community pharmacists have the ability to make meaningful changes now when they interact directly with patients at the counter. Educating patients about the importance of appropriate drug use, their options regarding drug-take backs, and paperless methods of communication can improve awareness for and address these issues by making adjustments at the community level first. Drug waste can be minimized and then disposed of properly. The paper and plastic waste inherently part of pharmacy business operations can be reduced. Electronic methods of information delivery such as electronic prescribing (e-prescribing) and computerized documentation can be implemented. The plastic composing medication stock bottles can be recycled and repurposed.³ Though various barriers exist in implementing such changes, these issues can be addressed by pharmacists immediately while legislation changes occur in the long run.

Introduction

In healthcare, it is insufficient to focus only on the direct patient treatment aspects. To be proper stewards of both our environment and the health of the future, the pharmacy industry must do its part to improve its patients' health in a more sustainable manner. As the front-line of the industry, community pharmacists have the ability to make a difference through both actions taken in their daily work and through the promotion of change at a regional or even company level. Drug disposal is a major issue that the healthcare industry faces. A 2015 paper cites estimates that the hospital and long-term care facilities in the nation alone dispose of more than "125 million pounds of pharmaceuticals each year."⁴ This estimate does not even include the numerous outpatient prescriptions and over-the-counter medications that are purchased every year and need disposal.⁴ Solving this issue requires patient education regarding medication use and proper disposal. In addition to significant medication waste, the business of pharmacy generates waste as part of typical operations, a significant portion of which is in the form of paper and plastic waste.^{2,3} Changes to the ways that pharmacies communicate patient education and maintain records may go a long way to reducing the operational waste that pharmacies produce. Community pharmacists can implement these changes now or suggest changes that can be made in the short-term, making a difference in their community while setting an example and advocating for long-term, widespread change.

Patient Education, Drug Disposal, and Medication Waste

Drugs and metabolites excreted by patients into sewage accounts for most of the pharmaceutical pollution in water.⁵ By educating patients on medication use, pharmacists can help to prevent the medication's inappropriate use, waste, and eventual elimination into bodies of water. Patient education is one of the primary jobs that pharmacists perform. Emphasis on medication compliance is a point that is beneficial not only to the patient's medication therapy outcome but can also be beneficial to pharmacy

sustainability. There are a variety of reasons for issues with medication adherence which often stem from a lack of patient education. Patients starting new medications need to be warned about their side effects so that these predictable, and usually manageable, issues are not a barrier to compliance. Drugs such as antibiotics may, on the other hand, be left unfinished because the patient is feeling better. Patients need to be counseled to finish their regimens to completely cure themselves and to prevent bacterial resistance. Finishing their regimens would have the added bonus of decreasing unused medicine. By improving compliance, patients will not only get the best use out of their prescriptions, but also fewer prescriptions will go unused and need disposal. Good compliance decreases waste and maximizes patient benefit by decreasing treatment failure and resultant downstream interventions.

Educating patients about proper drug disposal for expired or unusable medicines is a vital opportunity that pharmacists must improve patient awareness and participation in sustainable environmental practices. In reality, it may be difficult for pharmacists to mention disposal practices at every visit in a community setting, but adding information about proper drug disposal to patient product information documents may be a viable method. Currently, patients need to seek out information on where to dispose of their medication - for example on the FDA website - or ask a pharmacist.⁶ These extra steps might be enough to impede someone from taking the actions necessary to properly dispose of their medication. Having the information directly handed or electronically delivered to them would ease the burden of having to track down their medication on a website just to learn how to dispose of it.

Medications released into the environment have a variety of documented effects. For example, hormonal drugs used in people, such as 17-beta-estradiol, may have negative effects on the hormone systems of wildlife, such as those in fish.¹ The United States Environmental Protection Agency (EPA) advises that patients utilize drug take back programs such as those sponsored by the DEA to segregate medications from regular waste.⁷ For patients who do not have access to a drug take-back site, the FDA and EPA provide guidance on proper disposal of medications on their websites. Such information may not be readily available on patient information documents given at pharmacies. Including either disposal

instructions specific to the medication dispensed or instructions to find such resources on patient information may be a step towards decreasing the amount of medication entering the environment. The Drug Enforcement Administration conducts annual National Prescription Drug Take-Back Days.⁸ This is a perfect example of something in which pharmacists can play an active role. A simple sign or mention of this take-back day could provide an opportunity for patients to safely dispose of unused or unneeded medication. Having a list of places where there are drug take-back services would also be another way that pharmacists could raise awareness for this issue and provide an easy solution to medication disposal. While improper drug disposal is not the primary reason drugs become environmental contaminants, proper drug disposal will provide benefits that can help sustainability efforts and community safety in the long run.⁵

Impact of Operational Waste

Pharmacies are required to keep documents such as immunization records and paper prescriptions stored for many years, depending on what type of information they contain. Changing these documents to a paperless format could save thousands of tons of paper each year. Pharmacies have increasingly embraced paperless routes such as e-prescriptions and digital receipts. Taking this a step further to other documentation and patient prescription information could greatly reduce the amount of paper used in pharmacies and improve sustainability of pharmacy practice. CVS pharmacy alone used 54,500 tons of paper in 2018, some of which could have likely been replaced with paperless alternatives.² In addition, patient prescription information is typically given with every prescription. Once a patient has completed using the medication for an acute condition, the patient may see little use with these documents, and they often are thrown away. For patients getting refills, these documents may merely serve as additional copies and may, again, be thrown away. Even if some of the documents had been recycled, replacing most of the paper medication information on the more than 2.9 billion prescriptions generated from office visits in 2016 would have greatly decreased the impact pharmacies had on paper usage.⁹ While there are situations in pharmacy practice where paper is still essential, such as labeling prescription containers, immediately

providing patients with vital information, and providing updates on medications, not every situation requires paper use. A patient taking a chronic medication may be familiar with medication information documents given to them at each refill, possibly rendering them unnecessary. In such a situation, it may be beneficial to offer the patient electronic copies of such information. Though this is not something that pharmacists can directly control now, pharmacists can provide feedback to their higher-ups and promote sustainable paperless practices.

In addition to paper waste, pharmacies utilize large volumes of plastic containers to both store and dispense medications. Efforts to recycle medication stock bottles can further improve waste reduction. Stock bottles are a candidate for recycling services as reflected in a statement by the Association of Plastic Recyclers (APR). APR claims pharmacy stock bottles have been identified as “a highly marketable, quality stream of high-density polyethylene (HDPE).”³ The organization APR itself has considered establishing a Pharmacy Stock Bottle Recycling program similar to its Recycling Grocery Rigid Plastics program.³ In addition, attempting to use the smallest dispensing bottle possible for each prescription and packaging prescriptions as efficiently as possible can cut down on this waste. Both recycling and waste reduction are important to making pharmacy practice more sustainable.

Barriers Towards Implementation

Though patient education, recycling, and paperless communication methods are feasible short-term options, there are still a few barriers towards implementing these sustainable practices. Some patients prefer hard copies or do not have access to the internet or other forms of electronic communication. Recycling medication bottles can raise concerns regarding safety, especially if medications previously contained were especially potent or toxic. An example is warfarin bottles which contained a blood thinner and must be treated as hazardous waste.¹⁰ This requires separate disposal due to its potential toxicity. Certain medications are of a very high cost, therefore both shelf stability and demand may not warrant purchasing such medications in bulk amounts. These issues can be handled by identifying patients and medications that may be exempt from overarching sustainable practices and allowing individual patients to opt out of electronic documentation. Certain medication bottles may also be exempt from recycling

with the usual stock. When purchasing medications in certain container sizes, a pharmacist may exercise judgement as to whether it would be more efficient to purchase a bulk or small size container. Through careful effort and analysis, the benefits of sustainable practices can be balanced with the benefits of existing practice.

Limitations and Opportunities for Future Study

Though this article performs its goal of giving ideas and insight into ways that a community pharmacist could improve sustainability practices at their site, it has a few limitations. The industry of pharmacy is much more than just community pharmacy. It includes both the development and production of pharmaceuticals. Pollution from these sources results in detrimental effects on the environment and public health. For instance, antimicrobial waste in drug manufacturing was found to be associated with high levels of antibiotic-resistant bacteria and fungi in contaminated water at the sites of waste removal.¹¹ These incidences contribute to a significant amount of pollution by the industry, and are not addressed in this paper's body. In the future, discussion about more immediate ways to deal with issues in development and production would be helpful to pursue. Additionally, though the article discusses ways that the community pharmacist can make changes to help the community increase its sustainability, some of the suggested changes require company-wide policy shifts that may still take a significant amount of time to implement, depending on the size of the company and status as an independent or a chain pharmacy. In the future, it would be wise to explore long-term changes that could be made in both companies and legislatively to enhance the work that community pharmacists can accomplish now.

Conclusion

Though difficult, sustainability in pharmacy is most certainly attainable. Small steps taken by pharmacists today can turn into larger steps in the future as pharmacists lobby and advocate for better practices. Taking action now during patient interaction can raise awareness for pharmacy's sustainability

issues. This is accomplished by educating patients about proper disposal methods for certain medications and the importance of adherence to their medication regimens for both their health and the health of the environment. Additionally, applying practices like recycling stock bottles, efficient packaging, and digitizing documentation could greatly reduce the bulk of physical waste generated as a result of pharmacy operations. The latter changes will have to be suggested to company leadership but are more short-term policies that can be implemented without waiting for legislation. Pharmacists are some of the most accessible healthcare workers available, and they are among the top three trusted professions.¹² This unique position gives pharmacists the ability to truly impact the sustainability of the field when they perform their role as medication dispensers, experts, and counselors.

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